AIR QUALITY WHITE PAPER

Note: The following information is provided to help inform discussions at the Summit. Please understand, however, that this is not meant to be an exhaustive discussion of this issue, nor is it meant to confine your discussions at the Summit. Please bring your own knowledge, expertise, creative ideas and suggestions to the table!

BACKGROUND

While air quality in the Commonwealth continues to improve, there are currently 31 counties/cities in Virginia where air quality does not meet the standards set by EPA as necessary to protect human health. The Department of Environmental Quality is measuring the success of its air quality improvement efforts based on the statewide average of fine particulate concentrations, the trends in ozone levels, and the emissions of criteria pollutants (SO_2, NO_X, VOC, CO, $PM_{2.5}$). The air quality protection programs for the Commonwealth are governed by federal and state statutes and regulations.

Various programs and activities work together to implement the federal and state requirements for improving air quality in the Commonwealth. These activities are briefly described below.

Air Quality Standards: The Clean Air Act requires that the EPA set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants; these standards are designed to protect public health and the environment. EPA has set standards for seven air pollutants: ozone, particulate matter (two sizes--PM_{10} and $PM_{2.5}$), carbon monoxide, sulfur dioxide, nitrogen oxides, and lead. These standards must be reviewed periodically to determine if updated science requires revision of the standards.

Planning: DEQ not only develops plans and associated strategies to improve air quality in areas where standards and goals are not being met, but also develops plans to preserve air quality in areas that have already met these standards and goals.

Permitting for Stationary Sources: In order to limit the impact of stationary source activities on air quality, DEQ issues permits to new and existing industries to establish emissions limits, control technologies, and other requirements.

Motor Vehicle Emissions Standards: The EPA also establishes vehicle engine emissions and other standards aimed at reducing air pollution from this significant source category. As a result, emissions from vehicles have dropped dramatically over the last 40 year. These reductions will continue in the future as new standards are implemented.

Compliance/Enforcement: In order to ensure that regulated sources and activities comply with all applicable requirements regarding their operation and emissions, DEQ and EPA have the ability to initiate formal or informal enforcement actions to address problems when they occur.

Monitoring and Analysis: DEQ operates an extensive network of air quality monitors that observe and record ambient air quality conditions, as well as emissions. This data is then evaluated to determine, predict, and track progress toward meeting established air quality standards and goals.

ISSUE #1 – GROUND LEVEL OZONE

Nonattainment Areas and Redesignations: As of January 1, 2003, there were seven separate areas in the Commonwealth that did not meet the eight hour ozone standard based on ambient air quality monitoring data. These areas were Fredericksburg, Hampton Roads, Northern VA, Richmond, Roanoke, Winchester, and a portion of the Shenandoah National Park (SNP). Ozone is known as a "secondary" air pollutant because it is formed in the atmosphere from two primary precursor pollutants, volatile organic compounds and oxides of nitrogen, in the presence of sunlight. It is a respiratory irritant that affects human health at elevated levels.

Since 2003, a great deal of progress has been made in improving ozone air quality and, as of the 2006, monitoring in six of these nonattainment areas shows compliance with the standard. This progress is mainly attributable to regional and national emission control programs that have significantly reduced emissions from power plants and vehicles. As a result, only Northern VA, which is part of the Washington, DC-MD-VA metropolitan ozone nonattainment area, remains out of compliance. Fredericksburg and the Shenandoah National Park were removed from the ozone nonattainment list by EPA in early 2006 at the request of the DEQ. Similar requests and plans will be submitted for the Hampton Roads and Richmond areas in the near future.

Early Action Areas: The Roanoke and Winchester areas opted into a voluntary EPA program, called Early Action Compact Agreements, where they developed local control plans ahead of the statutory timeline in exchange for a delay in the nonattainment designation and requirements for these areas. These plans were submitted to and approved by EPA in 2005. As a result the designations for these areas have been deferred until 2008 at which time they will be formally designated to attainment as long as they continue to meet the air quality standard.

Attainment Plans: An air quality attainment plan must be developed for the Washington, DC-MD-VA area and submitted to EPA by June 2007. This plan must contain a strategy that can be demonstrated to bring the area into compliance with the ozone standard by 2009. This plan is currently being developed cooperatively by the jurisdictions involved and a number of stakeholder groups.

Ozone Transport: As required by the Clean Air Act, Virginia is a member of the Ozone Transport Commission, which is tasked with addressing the regional transport of ozone in the Northeast. This group promotes cooperation and regional actions to assist areas in meeting the standard by reducing ozone transport within the region. Only Northern VA is physically part of the ozone transport region.

Challenges and Issues

- Demonstrating compliance with the standard in the Washington area by 2009 may be problematic due to continuing high ozone readings. If the area cannot comply by 2009, additional emission reduction measures will be required.
- In the case of Northern VA, additional controls may be difficult to identify because the most effective and readily available options have already be imposed in the area.
- Continuing population and economic growth in the Commonwealth will impact our ability to sustain the progress made in improving air quality.
- Ozone is a regional pollutant; activities one state or region can impact another. States in the Northeast with persistent nonattainment areas are attempting to make the case that "upwind" states (like VA) contribute to their continued nonattainment problem and should do more to reduce transport. What additional controls (if any) will Virginia be required to impose or should Virginia be willing to implement in order to assist other states in solving ozone problems?
- EPA periodically reviews each air quality standard to determine if it is still adequately protective of human health in light of new scientific and health effects information. Such a review of the ozone standard is currently underway and could result in a revision to the standard. If this process were to result in a more stringent ozone standard, a number of areas in Commonwealth could again become nonattainment areas.

ISSUE #2 – FINE PARTICULATE MATTER

Nonattainment area in Northern Virginia: As of 2006, Northern Virginia is the only area in the Commonwealth that has been designated as a nonattainment area for the fine particulate matter air quality standards. Even though all of the monitors in Northern Virginia show compliance with the standards, this area was designated nonattainment because monitors in the District of Columbia show that the standard is being exceeded. Fine particulate matter is very small particles (2.5 microns or less) that have adverse health impact at elevated levels. The main constituent of fine particulate matter in the East is sulfates that are formed from sulfur dioxide emissions.

Unlike ozone, little progress has been made in reducing particle pollution with ambient levels remaining stagnant or slightly increasing in some areas. This is primarily due to the fact that there are no regional/national control programs in place for this pollutant. However, a major power plant sulfur dioxide control program will be implemented in 2010 that is predicted to significantly reduction the sulfate component and assist areas in meeting this standard.

Attainment Plans: An attainment plan must be developed for the Washington, DC-MD-VA area and submitted to EPA by April 2008. This plan must contain a strategy that can be demonstrated to bring the area into compliance with the fine particulate matter standards by 2010. This plan will be developed cooperatively by the jurisdictions involved and a number of stakeholder groups. It is currently predicted that the District of Columbia will be able to meet the standard by this date.

Clean Air Interstate Rule (CAIR): The EPA has adopted the CAIR rule to reduce the transport of pollutants and assist in standard attainment by further reducing pollution from the power sector. This rule covers most states in the East and each one must adopt corresponding rules to implement this program. A key component of the CAIR program is large reduction of sulfur dioxide emissions which will significantly reduce fine particulate pollution and improve regional visibility. Virginia is in the process of adopting a state rule to implement the CAIR emissions reduction requirements and caps and legislations that was adopted by the General Assembly in the 2006 session.

Visibility Improvement: Fine particles and regional haze are closely aligned and caused by common factors. Virginia is participating in the Visibility Improvement State and Tribal Association of the Southeast (VISTAS) regional haze planning organization to address and make progress towards improving visibility in the Southeast. The CAIR program is also a major part of the improvement strategy.

Challenges

- EPA has proposed to lower the daily and annual standard for fine particles which could bring new areas in Virginia into nonattainment status. EPA is also implementing separate standards for slightly larger particles which also may impact part of Virginia.
- Much of the excess fine particle pollution in urban areas like Washington is generated by motor vehicles. Currently there are only limited control measures available to reduce emissions from vehicles.
- Compared to other pollutants, less is known about the science of fine particulate matter formation and interactions in the atmosphere. This in turn increases the possibility of making incorrect or ineffective policy and strategy decisions.

ISSUE #3 – MERCURY DEPOSITION

Mercury contamination in Virginia waters has prompted several impaired waters designations and fish consumption advisories. A significant source of mercury contributing to this problem is airborne mercury deposition from power plants and other industrial sources. Once the mercury is deposited in bodies of water, natural biological processes can convert it to environmentally available methyl mercury, which is passed on to humans thru fish consumption.

Clean Air Mercury Rule (CAMR): The EPA has adopted the national CAMR rule to reduce mercury air emissions from the power sector. Virginia is in the process of adopting a state rule to implement the CAMR emission reduction requirements and caps.

Virginia Mercury Rule: In addition to the CAMR program, the State Air Pollution Control Board is considering regulations that would impose additional restrictions on power generation sources and other sources. The 2006 Virginia General Assembly passed legislation to reduce mercury emissions from coal-fired power plants by placing restrictions on the participation of these sources in a federal mercury emissions trading program.

Automotive Mercury Switch Recycling Program: The 2006 General Assembly passed legislation to require the removal and recycling of automobile switches that contain mercury. This will reduce mercury air emissions during the automotive steel recycling process; mercury emissions from steel recyclers accounts are significant.

VA Mercury Study: The General Assembly also directed DEQ to conduct a detailed assessment of mercury emissions in Virginia and local deposition of mercury emissions from Virginia sources. The study will examine the mercury reductions expected to occur as a result of the CAIR and CAMR regulations as well as the requirements of the state specific regulations, the costs of available controls, and the public health impacts of these choices, and recommendations on whether additional steps should be taken to control mercury emissions. This study is to be completed by October 2008.

Challenges

- Airborne mercury is a global pollution problem. It is estimated that a significant portion of mercury deposition in the US is generated by international sources.
- It is uncertain as to how much Virginia sources of mercury contribute to local air deposition. Although the percent contribution may be small, these sources may be contributing more to localized contamination "hotspots".
- There are non-utility industries in Virginia that emit significant amounts of mercury. Actual emissions from others are unknown. Is this significant and should these sources be controlled?

ISSUE #4 – CLIMATE CHANGE

Mainly as a result of the burning of fossil fuels, a buildup in "greenhouse gases" (GHG), such as carbon monoxide and methane, has occurred in the atmosphere. These gases tend to trap outgoing light energy and result in increasing the earth's temperature. It is estimated that the earth's surface temperature has risen by about 1 degree Fahrenheit in the past century. The US currently emits about 20% of the total global GHG emissions, mainly from power generation and transportation activities.

Pollution Prevention and Energy Conservation: The DEQ and DMME have established and proactive programs to promote and reward pollution prevention and energy conservation practices.

Challenges

- Climate change and GHG emissions are global issues, tied to world-wide population and economic growth. Cumulatively, the scale of solutions must be commensurate with the scale of the problem.
- Currently, there is no statutory authority on the federal level to regulate GHG emissions.
- Current efforts rely on voluntary programs and activities to reduce energy generation and consumption, and to promote more efficient alternative energy sources.

QUESTIONS TO CONSIDER

- How do we ensure that Virginia will be able to provide the air quality its citizens and visitors expect and demand?
- What specific goals and commitments do you believe are achievable in the next three years?
- How can pollution prevention be encouraged? What information or incentives are needed to encourage pollution prevention?
- How can we measure success? How will we know we are making progress towards achieving these goals for air quality?

NOTES: